K123131

FEB 0 8 2013

510(k) Summary

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ST AIA-PACK 25-OH Vitamin D

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Date:	October 3, 2012 Amended: January 7, 2013
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Device Name: **Classification:**	ST AIA-PACK 25-OH Vitamin D Class II MRG Clinical Chemistry 21 CFR 862.1825
Device Name: **Classification**	ST AIA-PACK 25-OH Vitamin D Calibrator Set Class II JIT Clinical Chemistry 21 CFR 862.1150
Device Name: **Classification**	AIA-PACK 25-OH Vitamin D Control Set Class II JJX Clinical Chemistry 21 CFR 862.1660
Predicate Device:	k983617 DiaSorin Inc. 25-Hydroxyvitamin D ^{125}I RIA Kit

510(k) Summary

ST AIA-PACK 25-OH Vitamin D

According to the requirements of 21 CFR 807.92, the following information provides sufficient detail to understand the basis for a determination of substantial equivalence.

Device Description:

The ST AIA-PACK 25-OH Vitamin D is a one-step delayed competitive enzyme immunoassay which, after sample pretreatment, is performed entirely in the ST AIA-PACK 25-OH Vitamin D test cup. Sample pretreatment reagents (containing sodium hydroxide) disassociate 25-OH vitamin D from its binding proteins in the test sample. 25-OH vitamin D present in the pretreated sample is bound to 25-OH vitamin D-specific monoclonal antibody immobilized on magnetic beads. After that, the enzyme-labeled 25-OH vitamin D is added to the reaction mixture. The enzyme-labeled 25-OH vitamin D competes with 25-OH vitamin D for binding to the antibody on magnetic beads in the reaction mixture.

After the second incubation, the magnetic beads are washed to remove the unbound enzyme-labeled 25-OH vitamin D and are then incubated with a fluorogenic substrate, 4-methylumbelliferyl phosphate (4MUP). The amount of enzyme-labeled 25-OH vitamin D that binds to the beads is inversely proportional to the 25-OH vitamin D concentration in the test sample. A standard curve is constructed, and unknown 25-OH vitamin D concentrations are calculated using this curve.

The following products are required to use the ST AIA-PACK 25-OH Vitamin D P/N 025234 :

ST AIA-PACK 25-OH Vitamin D Calibrator Set	025334
ST AIA-PACK 25-OH Vitamin D Pretreatment Set	025734
AIA-PACK 25-OH Vitamin D Control Set	025434

Device Intended Use:

ST AIA-PACK 25-OH Vitamin D is designed for in vitro diagnostic use only for the quantitative measurement of total 25-hydroxyvitamin D (25-OH vitamin D) in human serum, Na heparinized or EDTA plasma on TOSOH AIA System Analyzers. The Tosoh ST AIA-PACK 25-OH Vitamin D is intended as an aid in the determination of Vitamin D sufficiency.

Calibrators:

The ST AIA-PACK 25-OH Vitamin D Calibrator Set is intended for In Vitro Diagnostic Use Only for the calibration of the ST AIA-PACK 25-OH Vitamin D assay.

Controls:

The AIA-PACK 25-OH Vitamin D Control Set is intended for IN VITRO DIAGNOSTIC USE ONLY for performing quality control procedures with the ST AIA-PACK 25-OH Vitamin D assay.

Substantial Equivalence:

Comparison between the Tosoh ST AIA-PACK 25-OH Vitamin D and DiaSorin 25-Hydroxyvitamin D ^{125}I RIA Kit

Similarities

Parameter	ST AIA-PACK 25-OH Vitamin D	DiaSorin 25-Hydroxyvitamin D ^{125}I RIA Kit
Intended use	ST AIA-PACK 25-OH Vitamin D is designed for in vitro diagnostic use only for the quantitative measurement of total 25-hydroxyvitamin D (25-OH vitamin D) in human serum, Na heparinized or EDTA plasma on TOSOH AIA System Analyzers. The Tosoh ST AIA-PACK 25-OH Vitamin D is intended as an aid in the determination of Vitamin D sufficiency.	This kit is intended for the quantitative determination of the 25-hydroxy vitamin D (25-OH-D) and other hydroxylated vitamin D metabolites in human serum or plasma to be used in the assessment of vitamin D sufficiency. Assay results should be used in conjunction with other clinical and laboratory data to assist the clinician in making individual patient management decisions in an adult population.
Specimen type	EDTA plasma, Na heparinized plasma or serum	Serum or plasma

Calibrator Set

Parameter	ST AIA-PACK 25-OH Vitamin D Calibrator Set	25-OH-D3 Calibrators for Diasorin ^{125}I RIA Kit
Intended use	The ST AIA-PACK 25-OH Vitamin D Calibrator Set is intended for IN VITRO DIAGNOSTIC USE ONLY for the calibration of the ST AIA-PACK 25-OH Vitamin D assay.	The 25-OH-D3 Calibrators is used to calibrate the Diasorin ^{125}I RIA Kit.
Matrix	Human serum	Human serum
Number of Calibrators	6	6

Control Set

Parameter	AIA-PACK 25-OH Vitamin D Control Set	25-OH-D Controls for Diasorin ^{125}I RIA Kit
Intended use	The AIA-PACK 25-OH Vitamin D Control Set is intended for IN VITRO DIAGNOSTIC USE ONLY for performing quality control procedures with the ST AIA-PACK 25-OH Vitamin D assay.	The 25-OH-D Controls is used for performing quality control with the Diasorin ^{125}I RIA Kit.
Matrix	Human serum	Human serum
Number of levels	2	2

Differences

Parameter	ST AIA-PACK 25-OH Vitamin D	DiaSorin 25-Hydroxyvitamin D ^{125}I RIA Kit
Assay Technology	Fluorescence Immunosassay	Radioimmunoassay
Incubation Time	10 minute cycle	110 Minute Cycle
Reference range	10.8 to 54.75 ng/mL	9.0 – 37.6 ng/mL
Limit of detection	2.6 ng/mL	1.5 ng/mL
Assay Range	4.0 ng/mL – 120.0 ng/mL	4.8 ng/mL – 100.0 ng/mL

Calibrator Set

Parameter	ST AIA-PACK 25-OH Vitamin D Calibrator Set	25-OH-D3 Calibrators for Diasorin ^{125}I RIA Kit
Format	Lyophilized	Ready to use liquid
Calibrator Range	0-165 ng/mL	0-100 ng/mL

Control Set

Parameter	AIA-PACK 25-OH Vitamin D Control Set	25-OH-D Controls for Diasorin ^{125}I RIA Kit
Format	Lyophilized	Ready to use liquid
Controls Levels	Two levels at approximately 20 and 80 ng/mL of 25-OH vitamin D	Two levels at the low normal (9.0 ng/mL) and high normal (37.6 ng/mL)

PERFORMANCE CHARACTERISTICS

Precision

The precision for ST AIA-PACK 25-OH Vitamin D was determined based on guidance from CLSI Protocol EP5-A2.

Within- run precision was assessed by assaying three levels of pooled and spiked Na heparinized plasma, EDTA plasma and serum specimens with each lot number and instrument. Estimates of total and within-run precision were obtained from measurements of 2 replicates in a single run, 2 times a day for 20 non-consecutive days for each specimen/reagent/ instrument combination. This equaled a total of 40 runs and 80 determinants for each data set. There were three (3) data sets at each level for each specimen type.

Intra-assay (within run) Precision

Sample	Mean (ng/mL)	Standard Deviation (ng/mL)	Coefficient of Variation (%)
Serum A1	16.0	1.2	7.3
Serum B1	36.0	1.0	2.7
Serum C1	94.1	1.5	1.6
Serum A2	21.8	0.7	3.3
Serum B2	44.4	1.6	3.6
Serum C2	98.0	1.9	2.0
Serum A3	21.8	0.9	4.3
Serum B3	46.5	1.8	3.9
Serum C3	103.7	2.1	2.0
Na Hep Plasma A1	15.7	0.8	4.8
Na Hep Plasma B1	32.9	0.8	2.4
Na Hep Plasma C1	75.4	1.2	1.6
Na Hep Plasma A2	21.5	1.0	4.5
Na Hep Plasma B2	47.0	1.2	2.6
Na Hep Plasma C2	102.8	1.9	1.9
Na Hep Plasma A3	21.8	1.1	5.2
Na Hep Plasma B3	50.0	1.6	3.1
Na Hep Plasma C3	108.9	1.8	1.7
EDTA Plasma A1	13.7	0.7	4.9
EDTA Plasma B1	34.7	0.9	2.7
EDTA Plasma C1	71.1	1.2	1.7
EDTA Plasma A2	24.4	0.8	3.3
EDTA Plasma B2	47.4	0.9	2.0
EDTA Plasma C2	105.2	1.5	1.4
EDTA Plasma A3	25.6	1.1	4.2
EDTA Plasma B3	50.3	1.0	1.9
EDTA Plasma C3	110.9	1.3	1.2

Total Precision

Sample	Mean (ng/mL)	Standard Deviation (ng/mL)	Coefficient of Variation (%)
Serum A1	16.0	1.2	7.4
Serum B1	36.0	1.3	3.7
Serum C1	94.1	2.2	2.3
Serum A2	21.8	0.8	3.8
Serum B2	44.4	1.5	3.3
Serum C2	98.0	2.0	2.0
Serum A3	21.8	1.3	5.8
Serum B3	46.5	1.8	3.9
Serum C3	103.7	2.4	2.3
Na Hep Plasma A1	15.7	1.0	6.4
Na Hep Plasma B1	32.9	1.4	4.1
Na Hep Plasma C1	75.4	2.2	2.9
Na Hep Plasma A2	21.5	1.0	4.4
Na Hep Plasma B2	47.0	1.5	3.3
Na Hep Plasma C2	102.8	2.7	2.7
Na Hep Plasma A3	21.8	1.1	5.2
Na Hep Plasma B3	50.0	2.0	4.0
Na Hep Plasma C3	108.9	3.3	3.0
EDTA Plasma A1	13.7	0.9	6.6
EDTA Plasma B1	34.7	1.3	3.9
EDTA Plasma C1	71.1	1.9	2.7
EDTA Plasma A2	24.4	1.0	4.1
EDTA Plasma B2	47.4	1.4	2.9
EDTA Plasma C2	105.2	2.3	2.2
EDTA Plasma A3	25.6	1.2	4.7
EDTA Plasma B3	50.3	1.6	3.2
EDTA Plasma C3	110.9	2.8	2.5

Controls Precision

Intra-assay (within run) Precision

	Mean (ng/mL)	Pooled SD (ng/mL)	CV (%)
Level 1	20.0	0.79	3.9
Level 2	79.1	1.63	2.1

Total Precision

	Mean (ng/mL)	Pooled SD (ng/mL)	CV (%)
Level 1	20.0	1.16	5.8
Level 2	79.1	2.22	2.8

Linearity:

The linearity for ST AIA-PACK 25-OH Vitamin D was determined, based on guidance from CLSI protocol EP6-A. The linearity was measured on the AIA-2000 instrument and has been demonstrated to be linear from 4 ng/mL to 150 ng/mL.

Correlation

The methods comparison study was determined based on guidance from (EP9-A2).

a. Method Comparison

A total of 156 unaltered serum specimens were assayed in singleton utilizing the ST AIA-PACK 25-OH Vitamin D assay on the AIA-2000 analyzer and the 25-Hydroxyvitamin D ^{125}I RIA Kit (Diasorin).The regression analysis for the correlation between the alternate method (x) and the ST AIA-PACK 25-OH Vitamin D (y) is as follows:

	Deming	Regular
Slope:	0.934 (0.884 to 0.984)	0.885 (0.836 to 0.935)
Intercept:	2.53 (0.75 to 4.31	3.97 (2.21 to 5.73)
Corr Coef (R):	0.944	
Result Ranges:	Diasorin 4.4 to 103.0 ng/mL Tosoh 6.2 to 103.2 ng/mL	

*95% Confidence Intervals are shown in parentheses

b. Matrix Comparison

The correlation between serum (x) and Na heparinized plasma (y) on the ST AIA-PACK 25-OH Vitamin D was carried out using 115 unaltered specimens.

	Deming	Regular
Slope:	0.993 (0.974 to 1.012)	0.988 (0.978 to 1.007)
Intercept:	-0.390 (-1.13 to 0.36)	-0.20 (-0.94 to 0.55)
Corr Coef (R):	0.995	
Result Ranges:	Na Heparin 11.3 to 112.8 ng/mL Serum 11.0 – 111.1 ng/mL	

*95% Confidence Intervals are shown in parentheses

The correlation between serum (x) and EDTA Plasma (y) on the ST AIA-PACK 25-OH Vitamin D was carried out using 115 unaltered specimens.

	Deming	Regular
Slope:	1.041 (1.020 to 1.062)	1.034 (1.013 to 1.056)
Intercept:	0.091 (0.09 to 1.73)	1.14 (0.032 to 1.96)
Corr Coef (R):	0.994	
Result Ranges:	EDTA 11.6 to 111.9 ng/mL Serum 11.0 – 111.1 ng/mL	

*95% Confidence Intervals are shown in parentheses

Cross Reactivity

The following cross reactants were tested on the ST AIA-PACK 25-OH Vitamin D assay by spiking known quantities of the cross reactant in serum specimen.

Cross-reactants	Cross-reactivity* [mol%]
25-OH Vitamin D2 (30 ng/mL)	101.1
25-OH Vitamin D3 (158.2 ng/mL)	99.2
3-epi 25-OH Vitamin D2 (30 ng/mL)	131.3
3-epi 25-OH Vitamin D3 (30 ng/mL)	107.7
24,25-(OH)2 Vitamin D2 (100 ng/mL)	5.2
24,25-(OH)2 Vitamin D3 (100 ng/mL)	18.1
Vitamin D2 (1000 ng/mL)	0.5
Vitamin D3 (1000 ng/mL)	<0.1
1, 25-(OH)2 Vitamin D2 (1.0 ng/mL)	<0.1
1, 25-(OH)2 Vitamin D3 (1.0 ng/mL)	<0.1
Paricalcitol (2.0 ng/mL)	<0.1

Conclusion:

The ST AIA-PACK 25-OH Vitamin D recovers >/= 100 % for both 25-OH Vitamin D2 and 3-epi- 25-OH Vitamin D3 at 30 ng/mL.

The ST AIA-PACK 25-OH Vitamin D recovers approximately 100 % for 25-OH Vitamin D3 at 158.2 ng/mL.

The ST AIA-PACK 25-OH Vitamin D had a cross reactivity of 5.2% at 100 ng/mL of 24,25-Dihydroxyvitamin-D2.

The ST AIA-PACK 25-OH Vitamin D did not significantly cross react with 24, 25-(OH)2 Vitamin D3 at 100 ng/mL.

The ST AIA-PACK 25-OH Vitamin D did not significantly cross react with Vitamin D3 and Vitamin D2 at 1000 ng/mL.

The ST AIA-PACK 25-OH Vitamin D did not significantly cross react with 1, 25-(OH)2 Vitamin D3, 1, 25-(OH)2 Vitamin D2 and Paricalcitol at 2.0 ng/mL.

Reference Ranges

Number of Samples (n)	233
Reference Interval	10.8 - 54.75 ng/mL

The central 95% of the reference range was used to determine the reference interval.

Interference

Interference is defined, for the purposes of this study, with recovery outside of 100 +/- 10% of the known concentration of the specimen after the following substances are added to human specimens. Three studies were conducted using EDTA plasma, Na heparinized plasma and serum.

- Added hemoglobin (up to 11.4 mg/dL) does not interfere with the assay.
- Conjugated bilirubin (up to 18.4 mg/dL) and free bilirubin (up to 16.8 mg/dL) does not interfere with the assay.
- Lipemia, as indicated by triglyceride concentration (up to 357 mg/dL), does not interfere with the assay.

- Protein, as indicated by human albumin concentration (up to 8.5 g/dL), does not interfere with the assay.
- Ascorbic acid (up to 20 mg/dL) does not interfere with the assay.
- EDTA•2K (up to 10 mg/mL) does not interfere with the assay.
- Sodium Heparin (up to 100 U/mL) does not interfere with the assay.
- Rheumatoid factor (up to 500 IU/mL) does not interfere with the assay.

Limit of Detection and Limit of Quantification

The LoB and LoQ of the ST AIA-PACK 25-OH Vitamin D was determined based on CLSI guideline EP17-A.

The LoB was determined by 60 measurements of 3 different blank specimens. The LoB was the value at the 95th percentile. In this case the LoB was determined to be 1.6 ng/mL.

The LoD was determined by 10 measurements of 6 low level samples. The sample range was chosen to be between LoB and 4xLoB and 3 lots of reagents were utilized. The LoD was determined to be 2.6 ng/mL.

The LoQ was determined by 10 measurements of 18 low level samples and the CV% for each sample was calculated. The samples were selected to be in the range of LoB to 4xLoB. A precision profile was plotted for concentration vs. the CV%. The functional sensitivity at 20% CV was calculated and determined as the LoQ. The LoQ was determined to be 2.9 ng/mL.

The reportable range for the assay is 4.0 – 120 ng/mL.

Standards:

Number	FDA Recognition Number	Revision Date	Title
EP5-A2	7-110	10/31/2005	Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline-Second Edition
EP6-A	7-193	03/18/2009	Evaluation of the Linearity of Quantitative Measurement Procedures: a Statistical Approach: Approved Guideline
C28-A3	7-202	09/08/2009	Defining, Establishing, and verifying Reference Intervals in the Clinical Laboratory; Approved Guideline – Third Edition
EP17-A	7-194	03/18/2009	Protocols for Determination of Limits of Detection and Limits of Quantitation; Approved Guideline
EP9-A2	7-92	03/08/2004	Method Comparison and Bias Estimation Using Patient Samples; Approved Guideline-Second Edition
EP21-A	7-174	03/18/2009	Estimation of Total Analytical Error for

			Clinical Laboratory Methods; Approved Guideline

Conclusion:

The Tosoh Bioscience, Inc. ST AIA-PACK 25-OH Vitamin D is substantially equivalent to the DiaSorin Inc. (k)983617-Hydroxyvitamin D ^{125}I RIA Kit for in vitro diagnostic use only for the quantitative measurement of total 25-hydroxyvitamin D (25-OH vitamin D) in human serum, Na heparinized or EDTA plasma on TOSOH AIA System Analyzers. The Tosoh ST AIA-PACK 25-OH Vitamin D is intended as an aid in the determination of Vitamin D sufficiency

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

February 8, 2013

Tosoh Bioscience, Inc
c/o Robert L. Wick
6000 Shoreline Court, Suite 101
South San Francisco, CA 94080

Re: k123131
Trade/Device Name: ST AIA-PACK 25-OH Vitamin D,
ST AIA-PACK 25-OH Vitamin D Calibrator Set,
AIA-PACK 25-OH Vitamin D Control Set
Regulation Number: 21 CFR 862.1825
Regulation Name: Vitamin D test system
Regulatory Class: II
Product Code: MRG, JIT, JJX
Dated: January 08, 2013
Received: January 09, 2013

Dear Mr. Wick:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please go to http://www.fda.gov/AboutFDA/CentersOffices/CDRH/CDRHOffices/ucm115809.htm for the Center for Devices and Radiological Health's (CDRH's) Office of Compliance. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Carol C. Benson for

Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known): k123131

Device Name:

ST AIA-PACK 25-OH Vitamin D

ST AIA-PACK 25-OH Vitamin D Calibrator Set

AIA-PACK 25-OH Vitamin D Control Set

Indications For Use:

ST AIA-PACK 25-OH Vitamin D is designed for in vitro diagnostic use only for the quantitative measurement of total 25-hydroxyvitamin D (25-OH vitamin D) in human serum, Na-heparinized plasma or EDTA plasma on TOSOH AIA System Analyzers. The Tosoh ST AIA-PACK 25-OH Vitamin D is intended as an aid in the determination of Vitamin D sufficiency.

The ST AIA-PACK 25-OH Vitamin D Calibrator Set is intended for in vitro diagnostic use only for the calibration of the ST AIA-PACK 25-OH Vitamin D assay.

The AIA-PACK 25-OH Vitamin D Control Set is intended for in vitro diagnostic use only for performing quality control procedures with the ST AIA-PACK 25-OH Vitamin D assay.

Prescription Use ___X___ (21 CFR Part 801 Subpart D) And/Or Over the Counter Use ____. (21 CFR Part 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE; CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostic Device Evaluation and Safety (OIVD)

Yung W. Chan -S

Division Sign-Off
Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) k123131